

PANTEX PLANT

SITE PROFILE

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Office of Oversight
Environment, Safety and Health
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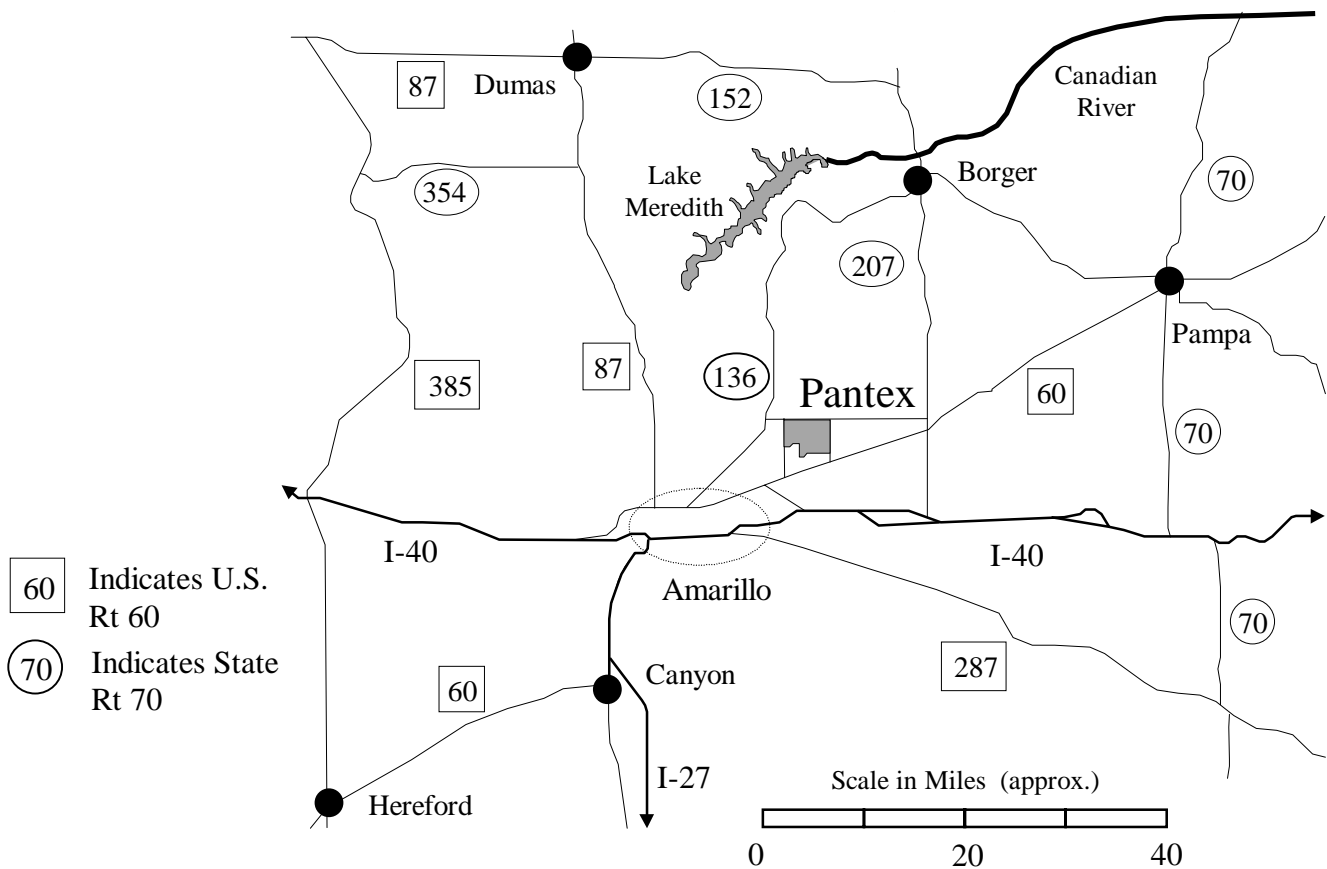
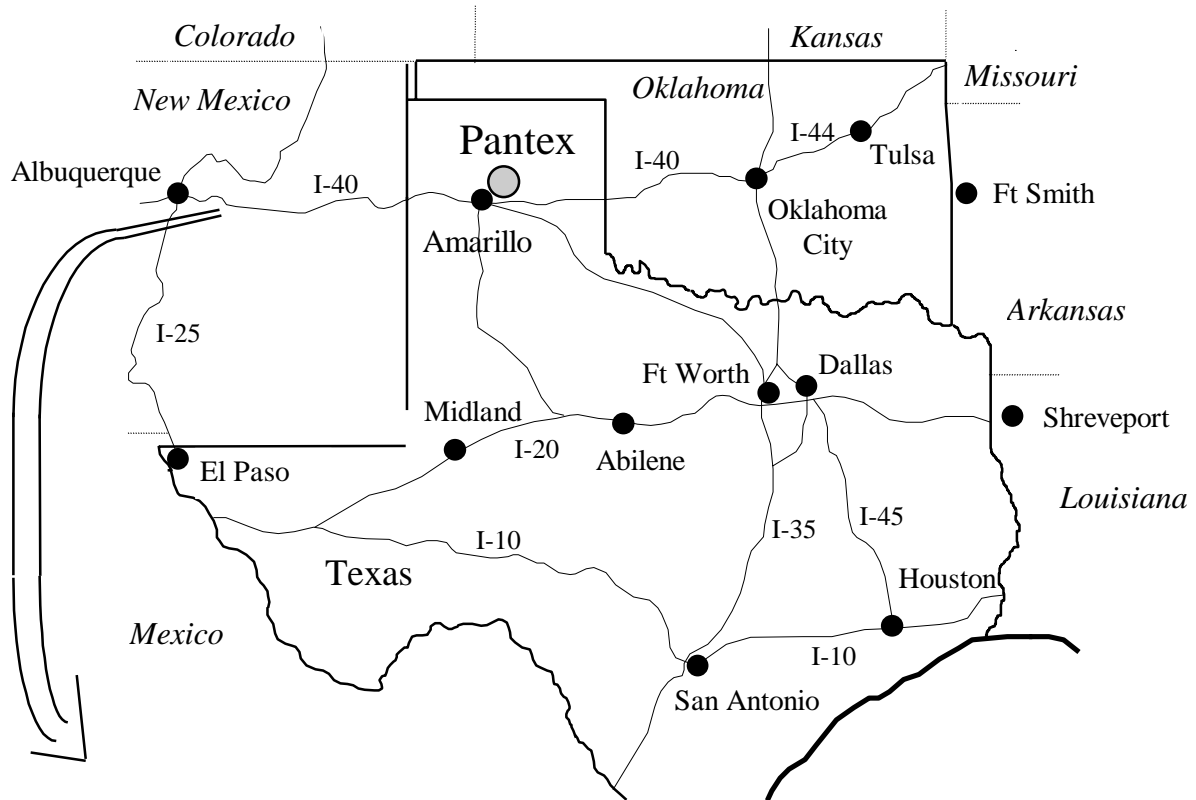
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Site profiles provide information on Department of Energy sites, including background; major environment, safety, and health initiatives and activities; items for management attention; and performance.

The electronic version of this site profile and other Office of Oversight documents referenced in this document can be accessed through the Internet at **<http://tis.eh.doe.gov/oversight.bookcase2.html>**.

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Pantex Site Map

PANTEX PLANT

BACKGROUND

Description

The Pantex Plant is located in Carson County, 17 miles northeast of downtown Amarillo, Texas. The Pantex Plant facility consists of 10,177 acres owned by the Department of Energy (DOE), including 9,100 acres in the main Plant area and 1,077 acres around Pantex Lake, approximately 2.4 miles northeast of the main Plant area. An additional 5,800 acres of land south of the main Plant area is leased from Texas Tech University for use as a safety and security buffer zone. The Pantex Plant was first used by the U.S. Army for production of conventional ordnance from 1942 to 1945. In 1951, the Atomic Energy Commission chose the site for expansion of its nuclear weapons assembly facilities.

The Pantex Plant is composed of several functional areas, commonly referred to as numbered zones. These zones include a weapons assembly/disassembly area (Zone 12), a weapons staging area (Zone 4), an area for experimental explosive development (Zone 11), a drinking water treatment plant (Zone 15), a sanitary wastewater treatment facility (Zone 13), and vehicle maintenance and administrative areas (Zone 16). Other functional areas include an explosive test-firing facility, an area for storage (Zone 10), a burning ground for explosive materials, and an area of landfills north of Zone 10.

The site's key facilities are described in Appendix A. Each facility's description includes its mission/status, hazard classifi-

cation/authorization basis, worst case design basis accident, and principal hazards and vulnerabilities. For the purpose of the profile, a key facility is a facility, building, or complex that is significant from an environment, safety, or health perspective.

Mission

According to the site, the missions are the fabrication of chemical explosives for nuclear weapons, assembly of nuclear weapons for the nation's stockpile, maintenance and evaluation of nuclear weapons in the stockpile, disassembly of nuclear weapons being retired from the stockpile, demilitarization and sanitization of weapon components from dismantlement activities, and interim storage of plutonium components from retired weapons. Weapons assembly, disassembly, and stockpile surveillance activities involve short-term handling (but not processing) of uranium, plutonium, and tritium, as well as a variety of non-radioactive hazardous or toxic chemicals.

Management

The lead program secretarial office is the Office of the Assistant Secretary for Defense Programs (DP). Within DP, the Office of the Deputy Assistant Secretary for Military Application and Stockpile Management (DP-20) is responsible for DP/Headquarters direction. The Office of the Assistant Secretary for Environmental Management (EM) also has programmatic interests at the site. The principal Headquarters offices and their areas of involvement are indicated in Table 1.

Table 1. Principal Headquarters Program Office Responsibilities for Pantex

Headquarters Program Office	Responsibility
<i>Office of the Assistant Secretary for Defense Programs (DP)</i>	Lead program secretarial office Stockpile management
Office of Military Application and Stockpile Management (DP-20)	
Office of Site Operations (DP-24)	
<i>Office of the Assistant Secretary for Environmental Management (EM)</i>	Environmental restoration
Office of Deputy Assistant Secretary for Environmental Restoration (EM-40)	
Office of Southwest Area Programs (EM-45)	

DP and EM provide program direction to the DOE Albuquerque Operations Office (AL). AL provides program direction to the DOE Amarillo Area Office (AAO), whose responsibilities

include oversight of environment, safety, and health (ES&H) programs. AAO manages the site contractor, Mason and Hanger Corporation (MHC), as shown in Table 2.

Table 2. Pantex Plant Operating Contractors

DOE Albuquerque Operations Office Responsible for management and administration of the prime contract	
DOE Amarillo Area Office Responsible for management and operating contract, oversight of Pantex operations and ES&H programs	
Mason & Hanger Corporation Management and operating contractor responsible for site management, operations, ES&H, and administrative functions	
Subcontractors	Responsibilities
Fuller Construction	Construction
Holmes Construction	Construction
Gardner-Zemke Construction	Construction
Duke Electric	Electrical contractor
Sandia National Laboratories	Design of assembly or disassembly of nuclear weapons and operate weapon evaluation test laboratory and system testing of nuclear components and non-nuclear assemblies

The contract between DOE and MHC, which began in 1956 and was extended several times, is due to expire on July 31, 2000. DOE has

decided to compete the contract and plans to have the new contract in place by July 31, 2000. This contract is a cost plus award fee, performance-

based contract that incorporates DOE contract reform initiatives. The Pantex Plant workforce is approximately 3,000, including 89 AAO and 100 Transportation Safeguards Division (TSD) Federal employees who transport nuclear weapons to and from the Pantex Plant.

Budget

The information appearing in this section has been gathered from a number of sources and represents the best available budget information at the time of profile

publication. This information is dynamic, depending on the point in the budget cycle at which it is obtained. It is included to provide the reader with a sense of the magnitude and sources of the budget for this site. It is not intended to be the definitive source of budget information.

The site budget for fiscal year (FY) 1999 is about \$275 million. The FY 2000 budget request is about \$269 million, as shown in Table 3.

Table 3. Major DOE Program Funding (In \$Thousands)

Organization	FY 1999 Approved	FY 2000 Request
Office of Defense Programs (DP)	\$260,759	\$246,866
Office of Environmental Management (EM)	11,299	15,000
Office of Fissile Materials Disposition (MD)	930	3,150
Office of Nonproliferation and National Security (NN)	2,300	4,300
Total	\$275,288	\$268,716

Source: FY 2000 Budget Request

Significant Commitments to Stakeholders

Agreement-in-Principle Between DOE and the State of Texas

In August 1990, DOE entered into a five-year agreement-in-principle (AIP) with the State of Texas. In October 1996, a five-year extension to the AIP commenced. The DOE grant for the AIP provides funding to the State of Texas to conduct environmental monitoring and restoration and emergency response at the Pantex Plant. Four state agencies and four local political subdivisions are involved: the Governor's Office, the Texas Natural Resources Conservation Commission (TNRCC), the Texas Department of Public Safety/Division of Emergency Management, the Texas Department of Health/Bureau of Radiation Control, the City of Amarillo, Potter County, Carson County, and Armstrong County.

Pantex Plant Environmental Permits

The Pantex plant operates under Hazardous Waste Permit, Wastewater Permit and Air Permit

issued by TNRCC and under National Pollutant Discharge Elimination System (NPDES) Industrial Wastewater Permit and NPDES Multi-Sector Storm Water Permit issued by the U.S. Environmental Protection Agency (EPA).

Federal Facilities Compliance Act (FFCA) Compliance Plan

The FFCA Compliance Plan, also referred to as the Site Treatment Plan, is described in the FFCA, Section 105(b), as a statutorily required "plan for obtaining and developing treatment capacities and technologies" to treat mixed waste at the Pantex Plant pursuant to the Resource Conservation and Recovery Act (RCRA). The Pantex Plant Order and Compliance Plan dated October 3, 1995, between DOE and the State of Texas provides the framework to fulfill the requirements of the FFCA. The details of the agreements can be found on the internet at www.em.doe/ffaa.

Defense Nuclear Facilities Safety Board (DNFSB) Recommendations

Table 4 lists the DNFSB recommendations significant to Pantex.

Table 4. DNFSB Recommendations Significant to Pantex

DNFSB Recommendation	Subject	Status
<i>98-2, Integrated Safety Management at the Pantex Plant</i>	This classified recommendation concerned opportunities to strengthen and simplify the process by which DOE designs and develops activities at the Pantex Plant.	DOE is implementing the recommendation as a part the integrated safety management system at the Pantex Plant.
<i>99-1, Safe Storage of Fissionable Material called "Pits"</i>	Safe short and long-term storage of pits at the Pantex Plant.	DOE has implementing the recommendation.

MAJOR ENVIRONMENT, SAFETY, AND HEALTH INITIATIVES/ACTIVITIES

Integrated Safety Management System (ISMS) Verification

An ISMS verification of MHC safety management process was conducted in July and August 1998 by a team from AL. The ISMS verification included Phase I, which reviewed the Integrated Safety Management (ISM) Program Plan and implementing standards, and Phase II, which reviewed a sampling of activities/facilities to assess implementation. The ISMS verification team concluded that MHC management is generally achieving the DOE objectives to systematically integrate safety management and work practices at all levels. However, the team noted several weaknesses. The most important weaknesses were in the areas of conduct of nuclear explosive operations; responsibilities for work at the lower levels of management of MHC; lack of an AAO Functions, Responsibilities, and Authorities Manual (FRAM); and inadequate configuration management

An ISMS verification review is scheduled for the end of January 2000.

Waste Management

The burning ground is used for processing sanitization of explosive classified components and RCRA treatment of explosive-contaminated

materials and waste by means of controlled open burning. Currently, natural gas is the primary means used to initiate burning. The land disposal area, north of Zone 10, is divided into two landfill sites. One is currently used for Class 2 non-hazardous wastes, and the other is primarily used to dispose of non-hazardous Environmental Restoration waste generated from the Solid Waste Management Units (SWMUs).

Pantex has a pollution prevention and waste minimization program. When practical, waste is recycled. Waste that cannot be disposed of in the two landfills or recycled is treated, if applicable, and disposed of offsite.

Pantex Request for Deletion from the EPA Superfund List

DOE began nuclear operations at the Pantex Plant in 1950. Current operations include the fabrication of nuclear weapons ammunition and the assembly, testing, and disassembly of nuclear weapons. Past waste practices included burning of chemical wastes in unlined pits, burial of wastes in unlined landfills, and discharging of plant wastewater into unlined ditches and surface impoundments on site.

The TNRCC is currently overseeing environmental cleanup work being conducted at the Pantex site under the RCRA corrective action program. On August 4, 1998, AAO forwarded a letter to the EPA requesting that the site be deleted from the National Priorities List (NPL),

with the understanding that Pantex would still fall under the TNRCC's RCRA program. The petition to delete Pantex from the NPL is the first request for total site deletion within the DOE complex. A public meeting was held on September 17, 1998, to discuss the rationale behind the request. Commonly called the Superfund, the NPL is a listing of sites that the EPA believes are in need of environmental restoration to clean up contamination. The EPA placed Pantex on the NPL in May 1994. EPA is currently reviewing the petition and will conduct public meetings. A decision on deletion from the NPL is expected before the end of calendar year 1999 or early 2000.

AAO and MHC management believe that Pantex is eligible for removal from the NPL because of (1) the significant progress made in environmental restoration of the Pantex Plant since its listing on the NPL, and (2) the excellent working relationship between Pantex and both the TNRCC and the EPA. Deletion from the NPL will save program funds by eliminating the duplication of administrative efforts resulting from the requirements imposed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and RCRA. If deletion from the NPL is approved, Pantex will continue to meet the requirements established under RCRA.

Stockpile Stewardship for Twenty First Century (SS-21) Process

The SS-21 initiative provides a significant and positive step toward integrating ES&H considerations into nuclear explosives operations and strengthening the interface with facility operations. The intent of the SS-21 process is to ensure that safety aspects of weapons processes are considered up front during the process development phase, instead of being reviewed after completion. SS-21 integrates ES&H considerations into work planning associated with nuclear explosives operations by using MHC production technicians and ES&H personnel, along with weapons experts, on process teams that develop the procedures and

training programs, define facility interfaces, design process layout, and establish tooling requirements.

The SS-21 process was piloted and is being used for the dismantlement of retired warheads. The SS-21 process has helped institutionalize conduct of operations and increased worker participation and empowerment related to safe operations. AL, AAO, and MHC plan to use the SS-21 process in other weapons-related work at Pantex.

Construction Activities

The projects currently under construction are: (1) High Explosives Synthesis Facility, Building 11-55; (2) Security Enhancement Project, which includes electronic enhancements; (3) Fire Protection System Upgrade Project, and (4) Facility Capacity Assurance Program (FCAP) Roads and Parking, (5) Public Address System Upgrade, (6) Radiation Monitoring System (RAMS) Upgrade, and (7) Outdoor Warning System.

ENVIRONMENT, SAFETY, AND HEALTH ITEMS FOR MANAGEMENT ATTENTION

This section identifies topics of concern to the Office of Oversight related to the Pantex Plant ES&H programs and their implementation.

The items noted below resulted from the Office of Oversight safety management evaluation in October 1996. One item, plutonium from pits, is a "legacy item" from the plutonium vulnerability study that still needs line management attention. The status of items that reflect issues identified in Office of Oversight safety management evaluation reports will be tracked in accordance with the recently approved DOE implementation plan for DNFSB Recommendation 98-1. Corrective action plans are developed by the line management and reviewed by the Office of Oversight in accordance with the guidance provided by DOE Order 414.1A and the Safety Management FRAM (DOE Manual 411.1-1A).

Two items from the June 1999 profile—work planning and control and unnecessary exposure of workers to explosives—are no longer included in this profile since these concerns have been adequately addressed by the site.

Potential for Release of Plutonium from Pits

Although work is in progress to provide a sealed container, the absence of a suitable sealed insert container for pits represents a significant vulnerability to plutonium oxidation and release if the outer metal shell of the pit is breached. Almost all plutonium at the Pantex Plant is weapons grade and is in the form of pits, the plutonium assemblies that serve as a primary nuclear component of a nuclear weapon. A pit typically consists of a plutonium metal shell surrounded by stainless steel. The pits are stored in magazines in AL-R8 containers (33-gallon steel drums) that are not hermetically sealed. Not all pits have been tested and qualified for extended staging, which begins after the service of a weapon. Potential weaknesses in joint material and design could make these vulnerable to failure and consequent plutonium release during handling and storage.

Action Status

MHC has proposed using an AL-R8 sealed insert, which is a stainless steel bolted container that provides an inert atmosphere for the pits. The sealed insert is placed into the AL-R8 container. The inert atmosphere prevents corrosion and cladding degradation, while the AL-R8 container provides additional protection for the pit. A major advantage of the MHC sealed insert is that it can be easily opened to inspect pits in various phases of staging. The Integrated Pit Storage Program Plan was approved by AL and the AAO Manager in October 1998.

AAO has reported that 230 pits have been packaged in the sealed inserts as of September 1999. In the letter of acceptance of DNFSB Recommendation 99-1, DOE has committed to accelerate the repackaging rate of 200 per month.

DOE has also agreed to develop a system of statistical sampling for the AL-R8 sealed insert containers and address the issue of long term safe storage of pits. DOE is preparing an implementation plan for the DNFSB Recommendation 99-1.

Issues Management

AAO and MHC management systems are not fully effective in identifying and resolving root causes of recurring ES&H items for management attention. Weaknesses exist in AAO and MHC management's ability to collect and analyze ES&H deficiency data to identify, prioritize, and resolve programmatic deficiencies. Weaknesses in information systems have impacted management's ability to identify recurring problems, perform meaningful trend analysis, and determine root causes. Strategies for improving issues management have not been fully developed, coordinated, and implemented.

Action Status

AAO and MHC have both implemented several process improvements and issued revised procedures to enhance the issues management system. MHC has identified additional actions in a corrective action plan to fully resolve this legacy issue. AAO and MHC will perform a validation of the issues management system in January 2000 to determine the adequacy of system implementation.

Authorization Basis Upgrade

The Pantex Plant lacks fully developed facility authorization basis documents such as safety analysis reports (SARs) and technical safety requirement (TSR) documents. Progress in updating SARs has been limited by ineffective DP and AL monitoring of MHC work activities; inconsistent reviews performed by AAO, AL, and DP staff; and difficulties experienced by MHC in resolving technical issues.

Action Status

AAO reports that progress has been made in developing authorization basis documentation. In May 1999, in response to the DNFSB Recommendation 98-2, DOE prepared a detailed implementation plan to enhance the authorization basis generation and review process for nuclear explosive operations. The corrective actions are scheduled to be completed in June 2000. Line management has scheduled a Phase II ISMS verification review to ensure that corrective actions are completed.

Procedural Adequacy and Adherence

Within AAO and MHC, the quality of and adherence to administrative procedures (i.e., procedures for operations, maintenance, and other activities not directly associated with nuclear explosive operations) at the Pantex Plant continue to be problematic (poorly integrated and hard to control and maintain). The deficiencies include lack of procedures, lack of training on procedures, and lack of compliance with procedures.

Action Status

AAO reports that AAO and MHC have implemented several improvements to address the lack of procedural adherence for administrative procedures. However, additional corrective actions are needed to fully resolve all of the identified concerns. A corrective action plan has been derived to define the remaining actions needed to close this issue by December 15, 2000.

ES&H Roles, Responsibilities, and Authorities

Roles and responsibilities for some safety related activities have not been fully communicated and documented among DP, AL, and AAO. Within DP, guidance issued for SAR development was not effective in ensuring the execution of responsibilities for SAR review and approval. Within AL, the lack of a current FRAM inhibits a clear understanding of organizational responsibilities for safety

management. Within AAO, organizational roles and responsibilities are established within numerous administrative procedures. The segmented nature of these procedures obscures the understanding of safety program responsibilities and authorities.

Action Status

With the changes instituted within DP, AL, and the AAO Facility Representatives and the promulgation of the AAO FRAM (AAO Procedure 103.4, April 1999), the roles of these organizations have been better defined, communicated, and understood. Defining the various responsibilities and authorities should strengthen organizational and individual responsibility. AAO reported that significant progress has been made on this item. The completion of the AL and AAO FRAMs adequately addresses the underlying cause of this safety legacy issue. AAO has recommended that this item be closed.

Configuration Management Program Implementation

Configuration management implementation at the Pantex Plant is incomplete. Full program implementation has received a low priority. Weaknesses include lack of piping and instrumentation drawings, a limited number of complete engineering system drawings, and inadequate equipment component labeling for critical safety systems.

Action Status

AAO reports that it has reviewed the MHC corrective action plan to address configuration management weaknesses. This plan references AAO Issues Management Board (IMB) 98-4 corrective action plan on the same subject. AAO has approved the IMB 98-4 corrective action plan submitted by MHC. The completion criteria for this corrective action plan include AAO performing assessment of various stages of program implementation in May 2000, December 2000, and September 2001.

RECENT SITE PERFORMANCE

Major Events

None.

Results of Major Recent Assessments

The Office of Oversight conducted a review of the Pantex occupational medical program in July 1999. The review, which focused on the quality and effectiveness of the Pantex medical program,

found no major deficiencies with the services provided to Pantex employees and determined that the medical program was well integrated into the site worker protection program. A special program developed by the Office of Oversight to promote external accreditation of DOE occupational medical program services was successfully completed by the Pantex medical staff, resulting in a three-year award. Pantex and only one other DOE medical facility have achieved this highest level of excellence awarded by the Accreditation Association for Ambulatory Health Care.

Appendix A. Key Facility Summary

FACILITY	MISSION/ STATUS	HAZARD CLASSIFICATION/ AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
Nuclear Explosive Bays	Mission: Assembly, disassembly, testing Status: Operational	Category II (Cat II) facilities; Authorization Basis - Basis for interim operation (BIO) 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101.	High explosive (HE) explosion, plutonium dispersal. Workers in bay killed.	Hazards: High explosives, plutonium, tritium, thorium, uranium, and beryllium.
Nuclear Explosive Cells	Mission: Assembly, disassembly, testing Status: Operational	Cat II facilities; Authorization Basis - BIO 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101.	HE explosion, plutonium dispersal. Workers in bay killed.	Hazards: High explosives, plutonium, tritium, thorium, uranium, and beryllium.
Nuclear Explosive Special Purpose	Mission: Testing of explosives, components, mass properties, radiography, vacuum testing, painting, etc. Status: Operational	Cat II facilities; Authorization Basis - BIO 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101.	HE explosion, plutonium dispersal. Workers in cell killed.	Hazards: High explosives, plutonium, tritium, thorium, uranium, and beryllium.
Nuclear Staging Facilities/Zone 12 Staging	Mission: Temporary staging of special nuclear material (SNM) Status: Operational	Cat II facilities; Authorization Basis - BIO 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101.	Blast driven missile penetrates 12-44 Cell 8.6 rem Committed Effective Dose Equivalent (CEDE) at site boundary	Hazards: High explosives, plutonium, and tritium.
Nuclear Staging Facilities/Zone 4 Magazines	Mission: Staging or storage of SNM and nuclear explosives Mission: Operational	Cat II facilities; Authorization Basis - BIO 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101.	Forklift punctures AL-R8 container. Less than 7 rem CEDE to onsite workers.	Hazards: High explosives, plutonium, tritium, uranium, beryllium, and thorium.
Explosives Development/ Zones 11 and 12	Mission: Developing and testing new high explosives Status: Operational	Low and medium (FS-3) nonnuclear hazard facilities; - DOD 6055.9 STD DOD Ammunitions and Explosives Manual; TM-5-1300 Structures to Resist the Effects of Accidental Explosions (11/90).;	Workers killed.	Hazard: High explosives.

Appendix A. Key Facility Summary (cont'd)

FACILITY	MISSION/ STATUS	HAZARD CLASSIFICATION/ AUTHORIZATION BASIS	WORST CASE DESIGN BASIS ACCIDENT	PRINCIPAL HAZARDS AND VULNERABILITIES
Explosives Manufacturing/ Zones 11 and 12	Mission: Formulating, pressing, and machining explosives Status: Operational	Low and medium nonnuclear hazard facilities;- DOD 6055.9 STD DOD Ammunitions and Explosives Manual; TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90).	Workers killed.	
Explosives Staging/ Zones 4, 11, 12 and 16)	Mission: Staging and storage of explosives Status: Operational	Low and medium nonnuclear hazard facilities; - DOD 6055.9 STD DOD Ammunitions and Explosives Manual; TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90).	Workers killed.	Hazard: High explosives.
Testing and Evaluation/ Zones 11, 12 and firing sites)	Mission: Testing and evaluation of explosives Status: Operational	Low and medium nonnuclear hazard facilities; - DOD 6055.9 STD DOD Ammunitions and Explosives Manual; TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90).	Workers killed.	Hazard: High explosives and their associated chemical components.
Explosive Treatment (Burning Grounds BG-3 & 4, and Bldg. 12-73)	Mission: Thermal treatment of explosives, decontamination and decommissioning of tools Status: Operational	Low hazard nonnuclear facilities; Authorization Basis - DOD 6055.9 STD DOD Ammunitions and Explosives Safety Manual; TM-5-1300 Structures to Resist the Effects of Accidental Explosions (Nov 90).	Workers killed.	Hazard: High explosives and their associated chemical components; airborne particulates.
Onsite Transportation and Loading Docks	Mission: Weapons and explosives transport Status: Operational	Cat II facilities; - BIO 2/99 (Manual, MNL-00076) and Critical Safety Systems Manual (CSSM) MNL-1101	HE explosion, plutonium dispersal, and workers killed.	Hazard: Plutonium (encased), explosives, and other hazardous materials.
Acid/Flammable Liquid Storage (Bldgs. 11-34, 11-39, 12-34)	Mission: Storage Status: Operational	Category not assigned; 29CFR 1910.	Accident/analysis under review.	Hazard: Acids and flammable liquids.